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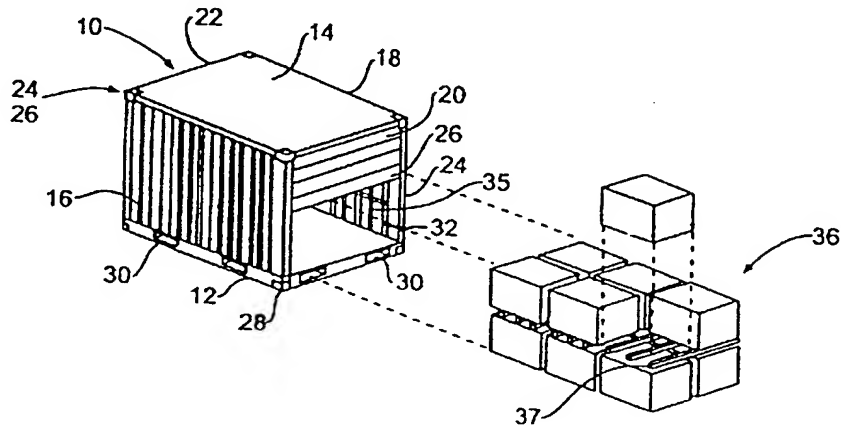
(54) Title: FREIGHT CONTAINER, SYSTEM, AND METHOD FOR SHIPPING FREIGHT



(57) Abstract: A freight transportation container can accept standard-sized pallets and is suitable for transportation by land, sea, or air. The size and construction of the container permits the loading and removal of freight by a conventional fork lift truck through the container, and allows placement of the container in standard-sized trucks, rail cars, sea vessels, and aircraft. The freight container also is part of a system and method for transportation whereby the freight can be loaded, inventoried, locked, and sealed at a customer's premise, and remain under the custody of one entity throughout shipment of the freight to the consignee. The containers can be linked together to assist in placing several of the containers on the truck, trailer, or rail car, where they can remain linked for transportation. The containers can be brought to a customer's premise on the truck, trailer, or rail car. The containers are then loaded. Afterwards, the containers can be taken to holding areas, other trucks, ships, aircraft, or directly to the ultimate destination. Transactional information regarding the freight and destination is stored in a computer, allowing a central system to track the freight and generate appropriate business and customer documentation.

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consignee. By way of example only, parcels of freight are typically picked up by one entity and brought to a transfer point where the goods are consolidated with other freight into boxes or containers. These boxes and containers, often containing freight for a variety of different customers, are then shipped by land, sea, or air to another site where the parcels of freight are unconsolidated, reloaded, and then delivered to the consignee. Throughout this process, different entities have custodial control of the freight, increasing the prospects of mishandling or error. This complex process results in obvious inefficiencies and expenses. It also increases the prospects for damage to or loss of the freight as it is transported from the customer's premise to the premise of the consignee.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a freight container, a system including a plurality of freight containers, and a method of shipping freight. Under the invention, a plurality of modular freight containers are sized to fit within standard sized shipping areas on trucks, sea vessels, and aircraft. By means of an example, three thirteen-foot long modular containers can be mounted to a truck that is capable of transporting a forty-foot container.

To achieve these and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, the invention includes a modular freight container for transporting and holding freight. The freight container comprising a base, a pair of opposed side walls, a pair of opposed end walls, a roof, and doors. Each side wall has a length of approximately 13 feet. Each end wall has an opening for the loading and removal of freight, where the openings are sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift. The doors selectively close the openings and secure the freight in the freight container.

In a further aspect, the doors are roll-up doors. In yet another aspect, the container further comprises a seal for securing the freight in the container. In still another aspect, the base can support a conventional forklift. In a further aspect, the container includes at least four and a maximum of eight connecting elements attached to the container. Each of the connecting elements is capable of accepting a latching device that can securely hold one or two adjacent containers together.

In another aspect of the present invention, the modular freight container includes a base, a pair of opposed side walls, a pair of opposed end walls, a roof, and a plurality of connection elements. The said side walls, end walls, and base define at their respective intersections four bottom corners. The side walls, end walls, and roof define at their respective intersections four top corners. Each end wall has an opening for the loading and removal of freight, where the openings are sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift. The connection elements are attached to the container at the corners and designed to accept a latching device that can securely hold two modular freight containers together.

Another aspect of the present invention is a system for shipping freight from the premises of the shipper to the ultimate destination. The system includes a plurality of freight containers for holding the freight to be shipped, a plurality of connection elements attached to the containers, a plurality of latching devices, and at least one vehicle for transporting the plurality of containers from the shippers premises to the ultimate destination. Each container includes a base, a roof, a pair of opposed side walls, and a pair of opposed end walls. Each end wall has an opening for the loading and removal of freight, where the openings are sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift. Each container has a length of approximately thirteen feet. The plurality of latching devices are capable of securely holding adjacent containers together at respective connection elements.

In another aspect, the plurality of containers are at least three containers secured together by said latching devices. In a further aspect, the vehicle is a land vehicle capable of supporting the three containers. In an additional aspect, the land vehicle is capable of supporting an additional container, where the additional container is separate from the three containers. In a different aspect, the vehicle is an aircraft capable of transporting up to 9 or more of the plurality of containers.

In another aspect, at least one vehicle includes a first land vehicle and a second land vehicle. The system further includes a sea vessel, wherein the first land vehicle is capable of transporting the plurality of containers to the location of the sea vessel. The second vehicle is capable of transporting the plurality of containers from the final destination of the sea vessel to the ultimate destination.

Another aspect of the present invention is a method of shipping freight from the customer's premises to the ultimate destination. The method comprises transporting at least two containers secured to a land vehicle to the customer's premises, wherein at least one container is empty. Each of the containers comprises a base, a roof, a pair of opposed side walls, and a pair of opposed end walls. The side walls, end walls, and base define at their respective intersections four bottom corners. The side walls, end walls, and roof define at their respective intersections four top corners. Each of the top corners and the bottom corners have a corner fitting mounted thereto. Each end wall has an opening for the loading and removal of freight, where the openings are sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift. The container has a length of approximately thirteen feet. At least one container is empty. At the customer's premises the method includes loading freight in at least one of the empty containers, forming a loaded container, and securing the freight in the loaded container. Finally, the method includes the step of transporting said at least one loaded container to the ultimate destination.

In another aspect, the step of transporting containers to the customer's premises includes transporting at least three containers. The containers are joined by a plurality of latching devices extending between adjacent corner fittings. In yet another aspect, the land vehicle includes a cab, and the step of loading freight in at least one of the empty containers includes loading the freight into the empty container closest the cab through all remaining empty containers.

In another aspect, the step of transporting at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a second vehicle destined for the ultimate destination.

In a further aspect, the consolidation site is an airport and the second vehicle is an aircraft. The step of transporting the at least one loaded freight container to the ultimate destination includes placing the loaded containers on the air craft, flying the aircraft to another airport, removing the loaded freight container from the aircraft, and placing the loaded freight container on a third vehicle destined for the ultimate destination.

In yet another aspect the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a vessel destined for the ultimate destination.

In yet a further aspect, the consolidation site is a seaport and the vessel is a ship. The step of transporting the at least one loaded freight container to the ultimate destination includes placing the loaded containers on the ship, sailing the ship to another seaport, removing the loaded freight container from the ship, and placing the loaded freight container on a vehicle heading to the ultimate destination.

Yet another aspect of the present invention is a method of shipping freight from the customer's premises to the ultimate destination. The method comprises providing at least three empty freight containers, each of said containers comprising a base, a roof, a pair of opposed side walls, and a pair of opposed end walls. The side walls, end walls, and base define at their respective intersections four bottom corners. The side walls, end walls, and roof define at their respective intersections four top corners. Each of the top corners and the bottom corners has a corner fitting mounted thereto. Each end wall has an opening for the loading and removal of freight, where the openings are sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift. The container has a length of approximately thirteen feet. The method includes providing a plurality of latching devices, and connecting three of the at least three containers together by linking the top corner fitting of one container to the adjacent corner fitting of another container with a latching device. The method further includes transporting the containers to the customer's premises. At the customer's premises, the method includes loading freight in at least one of the empty containers, forming a loaded container, and securing the freight in the loaded container. Finally, the method includes transporting the at least one loaded freight container to the ultimate destination.

In another aspect the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight container from the land vehicle, and placing the loaded container on a vehicle heading towards the ultimate destination. In a further aspect all containers of the single unit are loaded, and the steps of removing the loaded freight container and placing the loaded containers are performed by connecting a conventional lift to top corner fittings on each end of the single unit of containers. In yet another aspect, the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the

loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a vessel destined for the ultimate destination.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an isometric view of the freight container and an arrangement of freight to be placed in the freight container, in accordance with the invention;

Fig. 2 is an isometric view of a plurality of freight containers of the invention secured to a truck and a preferred process of loading the freight into the containers;

Figs. 3A and 3B are isometric views of a system for lifting three freight containers as one integral unit to load the freight containers onto a truck, trailer, or sea vessel in accordance with the invention;

Figs. 4A and 4B are isometric views of an alternative embodiment of the system of Figs. 3A and 3B of lifting three freight containers as one integral unit by conventional 40 foot spreader bars to load the freight containers onto a truck or sea vessel;

Fig. 5 is a plan view of a latching system for use with the invention;

Fig. 6 is an elevation view of the latching system of Fig. 5;

Figs. 7A and 7B show the latching device without the containers;

Fig. 8 is a schematic diagram showing several different ways of shipping a freight container from the customer to the ultimate destination.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

As will be explained in more detail below, the container, system, and method of the present invention represent an improvement over present containers systems and methods, where items of freight to be shipped are transported by one entity from a customer's premises to a central area where the items are then consolidated into a larger container, which in turn is transported and later unconsolidated, often by different entities.

Using the container, system, and method of the present invention, the freight container is brought to a customer's premises by truck or rail car where it will be loaded, inventoried, locked, and sealed. In a preferred embodiment of the invention, as shown in Fig. 2, a plurality of freight containers, which will be described below, can be brought to the customer's premises. The container is sized to allow a fork lift or a pallet jack to maneuver inside the container to load the freight, whether the freight is on skids or otherwise packaged.

The freight container preferably is sized and configured to accept the standard size pallet loads and to fit within a wide variety of conventional trucks, rail cars, sea vessels, and aircraft, such as a 747, without sacrificing efficient loading of the transporting vehicle, rail car, vessel, or aircraft. After the customer's freight is loaded, the freight container can be locked and sealed at the customer's location and transferred to the ultimate recipient in a locked and sealed state. Thus, the container

can be transported directly from a customer's premises to the intended recipient by truck or rail car; or by truck or rail car to a seaport, shipped to a different seaport, and transferred directly from the other seaport to the intended recipient; or from a truck or rail car to an airport, flown to a different airport, and transferred directly from the other airport to the intended recipient; or from a truck or rail car to a rail yard, shipped to a different rail yard, and transferred directly for the other rail yard to the intended recipient.

Alternatively, after the customer's freight is loaded into the containers, the freight containers can be taken to an intermediate site. At the intermediate site the freight containers can be removed from the truck or rail car, and sorted by destination. The freight containers are then loaded onto an appropriately destined truck or rail car and are transported to the destination by truck or rail car; or by truck or rail car to a seaport, shipped to a different seaport, and transferred from the other seaport to the destination city. The containers also can be transported by truck or rail car to an airport, flown to a different airport, transferred from the other airport to the destination city, and finally transported to the intended recipient. The containers also can be transported by truck or rail car to a rail yard, shipped to a different rail yard, transferred from the other rail yard to the destination city, and finally transported to the intended recipient. Fig. 8 shows a schematic arrangement of the various means of transporting the freight containers from the customer to the intended recipient. Fig. 8 is not intended to show all possible arrangements, but be merely descriptive of various arrangements.

With reference to Figs. 1 and 2, the freight 36 shipped according to the present invention is securely held throughout the transfer process in an integral container 10 which is sized and configured to accept standard loads of freight and be accepted and efficiently transported by conventional trucks, sea vessels, and aircraft. As shown in Fig. 2, a plurality of freight containers 10 are attached to a trailer 38. As shown in Fig. 1, the container 10 has a base 12, a roof 14, a pair of

opposed side walls 16 and 18, a pair of opposed end walls 20 and 22. In this preferred embodiment, the base 12 and roof 14 are generally parallel to each other, as are the respective end walls 20 and 22 and side walls 16 and 18. International Organization for Standardization (ISO) corner fittings 28 are located at the top corners formed by the intersection of the roof 14, side walls 16 and 18, and the end walls 20 and 22. ISO corner fittings 28 are also located at the bottom corners formed by the intersection of the base 12, side walls 16 and 18, and end walls 20 and 22. The base 12 includes four fork lift pockets 30 that extend through the base 12. Tension control straps 32 can be provided at the side walls 16 and 18. The straps 32 can be used to secure freight inside the container. The container 10 preferably has outer dimensions of thirteen feet long by eight feet six inches high by eight feet wide, or approximately thirteen feet long by eight feet six inches high by eight feet wide.

In a preferred embodiment of the container 10, a plurality of vertical tracks 35 may be mounted to the side walls 16 and 18. The tracks 35 cooperate with load bars 37 which separate the freight 36 in multiple layers. Any track system, such as the E-Track System manufactured by Kinedyne will work.

Each end wall 20 and 22 has an opening 24 for loading and unloading of freight. The container 10 and the opening 24 of each end wall 20 and 22 are sufficiently large to permit the loading and unloading of freight to and from the container 10 by a conventional fork lift truck 40. The container 10 also includes doors 26 to securely close the openings 24, once the freight is loaded, thereby securing the freight within the container 10 The container 10 also includes a locking feature which permits the doors to be locked, thereby preventing unauthorized access to any freight loaded in the container 10.

The container 10 can include a variety of different types of doors 26 or security closures. Preferably, the doors 26 are designed so that they can be opened from either inside or outside the container 10. The doors 26 preferably are designed

so that they can be opened and unopened while two or more modular containers are fixed to or aligned with each other, end to end. In a preferred embodiment of the container 10, the doors 26 are roll up doors. Such an embodiment is shown in Fig. 1. By using roll-up doors 26 at each end of the modular container 10 of the present invention, a fork lift truck 40 or similar loading device can readily move from one container 10 to the next, when they are placed end to end. The doors 26 can also be easily opened or closed, when the containers are placed end to end.

A wide variety of locking features can be used to lock the doors 26 of the container 10, once it is loaded. Simple clasps and padlocks could be used, as an example. On the other hand, the container 10 could be designed to include sophisticated electronic locks which could be used, with the shipper having a computer controlled key system.

The freight container 10 of the present invention was designed to provide an extremely compatible and efficient container for transferring freight by land, sea, and air. In addition, the container 10 is constructed so that it is seaworthy and weatherproof. The walls and doors of the container 10 are constructed so that the container, when closed and locked, is substantially airtight, protecting the freight from adverse environmental conditions. The freight container 10 of the present invention preferably should be made of low weight, strong, and fire resistant materials, but can be made of steel. While steel and low weight metals such as aluminum can be used to make the containers, other composite materials such as carbon-fiber composites, carbon/Kelvar composites, and Kelvar/Spectra composites are preferred. Other known composites for making aircraft bodies and parts also can be used. The container's construction should result in a higher ratio of content weight to container weight. Consequently, the freight in the container will comprise a higher proportion of the gross shipping weight. This allows more freight to be shipped in each transfer means.

In addition, the physical characteristics of the freight container 10 are designed to serve the purpose of providing a lightweight, yet safe, container. The container 10 offers enhanced customer convenience and simplified, efficient handling. The preferred outer dimensions of the container 10 are thirteen feet long by eight feet six inches high by eight feet wide. With these dimensions, each container 10 can accommodate up to six standard forty inch by forty eight inch pallets per layer of freight. Six pallets can fit on the floor, and six more can be stacked in each layer using the load bars.

The length, width, and height of the containers are chosen to provide the widest compatibility of the container with conventional trucks, sea vessels, and aircraft, while promoting efficiency and economy. By means of an example, 9 or more freight containers of the present invention can fit on a Boeing 747-400F aircraft. The freight container 10 of the present invention is also compatible with standard trucks, such as flat bed trucks, and trailers for carrying freight. Again, by means of an example only, two containers fit on a truck with a twenty-eight foot bed or a twenty-eight foot flat bed trailer. Three containers fit on a truck with forty and forty-five foot beds, or forty and forty-five foot flat bed trailers. Four containers can fit on trucks with fifty-three foot beds, or fifty-three foot flat bed trailers. As previously explained, the containers are sized to accept freight loaded on standard sized pallets.

The container 10 of the present invention preferably has a tare weight of less than 3700 pounds, a freight volume of approximately 700 to 750 cubic feet, and a gross weight of approximately 17,500 pounds. The container 10 preferably should be made of opaque materials so that the freight within the container cannot be viewed by unauthorized persons. The container 10 can also have insulation and/or an inner liner, to add protection for the freight.

The base 12 of the container 10 preferably is flat and smooth on the inside. The flat surface of the base 12 allows the customer to bring a forklift 40 or other premises device into the container 10 to load or unload articles

Several different systems may be employed for loading and securing the freight container 10 onto a truck. For example, the freight containers can be loaded individually by a heavy duty fork lift, which is larger than a conventional fork lift 40, onto a truck chassis and secured to the truck trailer using chains or straps. In this manner, three or four containers can be loaded on the truck trailer. A more efficient and preferred system for loading the freight containers onto a truck, trailer, or sea vessel; is shown in Fig. 3A and Fig. 3B. A plurality of containers 10 are joined together end-to-end. This is accomplished by temporarily joining or fixing the containers together by a mechanical system. In one example, one corner on a first container is joined with a horizontally matching corner on a second container using the ISO corner fittings 28 and a latching device or system. Figs. 7 and 8 show one embodiment of a latching device 80 for connecting the freight containers 10 together using the ISO connector fittings 28. The latching device 80 will be described below. The latching device 80 is exemplary only and is designed so that when three freight containers are joined together as a single unit, they form a single forty-foot unit. Once the containers are latched together, a conventional lift 42 for standard forty foot containers can be used to lift the single unit and place the unit upon the truck, trailer, or sea vessel. Although a conventional lift 42 is shown, it is understood that any device, such as cable slings, designed to lift a 40' freight container could be used to lift the containers.

Once placed upon the truck, trailer, or sea vessel, the containers can remain latched together or can be disconnected. If there is room, a fourth freight container can be loaded onto the truck trailer using a conventional fork lift. This allows forty foot and fifty-three foot trailers to be used to transfer the freight containers. If desired, connection devices and lift systems for connecting and loading four or more

containers can be designed according to the principles of the present invention. The freight containers are secured to the truck or trailer by any of several conventional means. For example, they can be secured by running chains or straps through the laterally exposed fork lift pockets.

The process of connecting three freight containers together and using the latching devices and conventional lift for standard forty foot containers can be used to load and unload a sea vessel designed to carry forty foot containers. The freight containers could remain connected to take advantage of the existing securing means on the sea vessel for forty foot containers.

Figures 4A and Fig. 4B show an alternative system for loading a unit of three of the freight containers onto the truck, trailer, or vessel. The first step is to connect each freight container 10 to a pair of spreader bars 44 at the top corner ISO fittings 28. This is accomplished by locking the elements together through mechanical devices, such as bolts, latches, or similar elements, preferably ones that interconnect with opposing ISO corner fittings 28. The next step is to lift the three freight containers as one unit by the spreader bars 44. This can be accomplished using a conventional lift 42 designed for standard forty foot containers. The final step is to place the three freight containers onto the truck, trailer, or vessel.

The latching device 80 is shown in Figs. 5-7. The latching means 80 has a body 82 and two clamp arms 84 and 88. The body 82 is approximately six inches wide to provide sufficient space between the two freight containers 10 and 10'. The latching device 80 is similar to a horizontal connector that is available from Tandemloc, Inc., where the body has been modified from its standard size to be six inches wide. The latching device 80 is inserted between two horizontally matching ISO corner fittings 28 and 28', such that the clamp arms 84 and 88 engage the openings 29' and 29. Screws 86 and 90 are associated with clamp arms 84 and 88 respectively. Screws 86 and 90 are turned until they are flush with the body 82, which causes the clamp arms 84 and 88 to close and securely fasten the body 82

between the freight containers 10 and 10'. This process is preferably repeated at each corner until all the freight containers are joined together.

The system and method of shipping freight is shown in Fig. 2. where the freight container of the present invention is transported directly to a customer's premises by a truck. Under the principles of the present invention, one or several containers of the present invention can be brought to the customer's loading dock or left within the customer's premises. The freight container preferably is left on the chassis of the truck.

At the customer's premises, the freight of the customer (be it correspondence, paperwork, materials, goods, components, or finished products, or any other type of freight) is loaded into the container. The freight can be loose freight or freight already fixed to standard shipping pallets, such as forty inch x forty eight inch wood pallets. The freight can be loaded by hand or by conventional loading devices, such as fork lift trucks. The loading can be done by employees of the customer, or by employees or agents of the carrier, depending upon the circumstances and the desire of the customer.

The customer chooses how many freight containers will be necessary to ship the freight. The customer has the option of either separating the freight by destination and loading the freight containers accordingly, or keeping all of the freight together. When the containers are aligned end to end, the freight is loaded by filling the forward most freight container first. To do this, the most forward facing roll up door is closed, and all other freight container doors are left open. The freight is loaded either by hand or by conventional loading devices, such as fork lift trucks, and transported through the open containers. Once the forward most container is filled the rearward roll up door of the freight container is closed. To fill the next container, the process is repeated. This continues until all freight from the customer has been loaded.

In a preferred embodiment, a first layer of freight is placed at the forward most portion of the container, where it may be arranged on the floor. Then load bars 37 are inserted into the tracks 35 as described above. Additional freight may be placed upon the load bars 37. This process may be repeated until the forward most portion of the container is filled. Then the process may be repeated until the container is filled from the forward most portion to the rear of the container.

If empty containers remain, the truck can be driven to a different customer's premises to pick up additional freight. Thus, in one preferred method, two, three, or four containers, positioned end to end, are placed on a truck driven to a first customer's premise, where one or more containers are loaded. The truck with the loaded and empty containers can be driven to a second customer's premise, and so forth, until each of the containers is loaded. The loaded containers can then be shipped to the ultimate recipient.

In a preferred embodiment of the present invention, the freight of a customer that is to be shipped to a given final address of its intended recipient is loaded into one or several modular containers of the present invention, so that the freight in a given container can be secured in the container and not rearranged until it arrives at its final destination. If a customer has enough freight for an intended recipient to fill more than one container, then two or more containers of the present invention are aligned end to end and filled in order, as shown generally in Fig. 2. When three containers are filled with freight to the same ultimate customer, the containers can be connected together through the connecting devices of the present invention, to facilitate loading and unloading the containers. When the containers are to be shipped by large trucks or by ships, three of the modular containers of the present invention are preferably connected together to form an integral forty foot long unit.

Under the system and method of the present invention, transactional data regarding the identity, nature, and destination of the freight can be placed into a portable computer device at the customer's premises. This transactional data in turn

can be transferred to a central system to track the freight and generate appropriate business and customer documentation. In addition, bar code labels or radio tags can be placed on the container itself, to permit easy tracking of the freight.

After the freight is loaded into the container and documented, the container is locked. Preferably, a seal is also placed on the locked doors in a manner such that the seal necessarily will be broken if the doors are opened. This aspect of the invention protects the freight.

According to the invention, the loaded, locked, and sealed container is then transported to the ultimate recipient by the carrier. In some embodiments of the invention, the container is shipped to the ultimate destination, by the carrier, to the intended recipient by trucks only. In most instances of the present invention, one or more modular containers are transported by a number of different modes of transportation (e.g. truck, aircraft, trains, ships, etc.) before they are received at the final destination. In the preferred embodiment, the containers are at least once, and often on two or more occasions, transported to an intermediate staging area or consolidation site where a plurality of modular containers of the present invention are transported from different customers and then sorted into different lots, to be shipped to common intermediate or final locations. The sorted containers are then shipped to the next location, where the modular containers are then unloaded from one transportation device to the next. Preferably, when three modular units have a common final or intermediate destination, they are connected or loaded together as a unit and transported on larger trucks or ships.

Containers of the present invention will preferably be transported on the ground on a chassis pulled by conventional tractors, generally three containers per chassis (40 feet) in Europe and Asia, two or four containers per chassis (28 feet or 53 feet, respectively) in the United States. When transported by ships, the containers preferably will be loaded and unloaded in integral units of three connected containers. The containers, and such units, will fit in conventional vessel container

slots. If moved in the air, the containers will load in an aircraft, such as a 747, using an aircraft pallet and a floor lock system, such as a Boeing floor lock system.

For example, in one embodiment of the present invention, the container is picked up by the carrier's delivery truck and then transferred, directly or indirectly, to a seaport. There, one or more containers are loaded into a sea vessel by conventional loading devices. Preferably three containers are fixed to each other to form an integral forty foot long unit. The container or containers are placed in the sea vessel at selected positions and held in place by locking elements. The sea vessel and container(s) are then sailed to a destination seaport. At the destination seaport, the container(s) are taken off the sea vessel and transferred to one or more trucks. The containers are then transported by the trucks to the premises of the desired recipient.

As another example of the present invention, the container is picked up by the carrier's delivery truck and then transferred, directly or indirectly, to an airport. There, one or more containers are loaded into an airplane by conventional loading devices. The container or containers are placed in the aircraft at selected positions and held in place by locking elements. The airplane and container(s) are then flown to a destination airport. At the destination airport, the container(s) are taken off the airplane and transferred to one or more trucks, or to a ship. The containers are ultimately transported by the trucks to the premises of the desired recipient.

The above-described container system and method of the present invention provide improved customer convenience and shipping efficiency. For example, the cargo can be bar coded by the customer or the carrier while it is being loaded and unloaded. As an alternative, a bar code label or RF tag can be placed on the container itself, after it is loaded. Preferably, other data regarding the cargo, and its characteristics, is also documented and placed within a computer system. Preferably, the computer system is a network which is accessible by a customer, so that the customer can utilize the shipper's tracking and processing system. This

direct interface between the customer and the shipper will make it possible to expedite the preparation of business documents and the delivery of the manifest to the recipient. Coordination of arrival times will be simpler and faster. Furthermore, the system can be designed to interface with American and foreign customs departments and be capable of creating customs documents.

In a preferred embodiment of the invention, the freight container, once loaded, locked and sealed, will be under the carrier's custody and control through its travel from the shipper's premises to the recipient's premises. In international shipment, customer's preclearance can be available for many types of freight, so that the freight container will remain locked and sealed until it reaches its final destination.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

WHAT IS CLAIMED IS:

1. A modular freight container for transporting and holding freight comprising:

a base;

a pair of opposed side walls, each side wall having a length of approximately 13 feet;

a pair of opposed end walls, each end wall having an opening for the loading and removal of freight, said openings being sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift;

a roof; and

doors to selectively close said openings and secure the freight in the freight container.

2. The modular freight container according to claim 1, wherein said doors are roll-up doors.

3. The modular freight container according to claim 2, further comprising a seal for securing the freight in the container.

4. The modular freight container according to claim 1, wherein said base is sufficiently strong to support a conventional forklift.

5. The modular freight container according to claim 1, wherein said container includes connecting elements, each of the connecting elements capable of cooperating with a device to temporarily join two adjacent containers together.

6. The modular freight container according to claim 1, further comprising a support system connected to said side walls, and a plurality of load bearing members mounted in said support system, wherein said load bearing members are capable of supporting the freight.

7. A modular freight container for transporting and holding freight comprising:

a base;

a pair of opposed side walls;

a pair of opposed end walls, wherein said side walls, end walls, and base defining at their respective intersections four bottom corners, each end wall having an opening for the loading and removal of freight, said openings being sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift;

a roof, wherein said side walls, end walls, and roof defining at their respective intersections four top corners; and

a plurality of connection elements for accepting a latching device that can securely hold two modular freight containers together.

8. The modular freight container according to claim 7, further comprising doors to selectively close said openings and secure the freight in the freight container.

9. The modular freight container according to claim 8, further comprising a seal for securing the freight in the container.

10. A system for shipping freight from the premises of the shipper to the ultimate destination, the system comprising:

a plurality of freight containers for holding the freight to be shipped, each container including a base, a roof, a pair of opposed side walls, a pair of opposed end walls, each end wall having an opening for the loading and removal of freight, said openings being sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift, said container having a length of approximately thirteen feet;

a plurality of connection elements associated with each container;

a plurality of latching devices that cooperate with one or more connection elements to temporarily join adjacent containers together at respective connection elements; and

at least one vehicle for transporting said plurality of containers from the shippers premises to the ultimate destination.

11. The system according to claim 10, wherein three containers are joined together by said latching devices.

12. The system according to claim 11, wherein said vehicle is a land vehicle capable of supporting the three containers.

13. The system according to claim 12, wherein said land vehicle is capable of supporting an additional container, said additional container being separate from the three containers.

14. The system according to claim 10, wherein said vehicle being an aircraft capable of transporting 9 or more of said plurality of containers.

15. The system according to claim 10, wherein the system includes a first land vehicle and a second land vehicle, the system further including a sea vessel, wherein said first land vehicle is capable of transporting said plurality of containers to said sea vessel and said second land vehicle is capable of transporting said plurality of containers from said sea vessel to the ultimate destination.

16. The system according to claim 11, wherein said latching devices space the adjacent, joined containers by a preselected distance between the adjacent end walls of each container.

17. The system according to claim 11, wherein each of said latching device has a first latching portion and a second latching portion, said first latching portion capable of mechanically grasping one of said connector elements associated with one of the containers, and said second latching portion capable of mechanically grasping one of the connector elements of the adjacent container.

18. A method of shipping freight from the customer's premises to the ultimate destination, the method comprising:

transporting at least two containers secured to a land vehicle to the customer's premises, wherein at least one container is empty, each of said containers comprising a base, a roof, a pair of opposed side walls, a pair of opposed end walls, wherein said side walls, end walls, and base define at their respective

intersections four bottom corners, wherein said side walls, end walls, and roof define at their respective intersections four top corners, each of said top corners and said bottom corners having a corner fitting mounted thereto, each end wall having an opening for the loading and removal of freight, said openings being sufficiently large to permit the loading and removal of freight to and from the container by a conventional forklift, said container having a length of approximately thirteen feet, at least one container being empty;

at the customer's premises loading freight in at least one of the empty containers forming a loaded container and securing the freight in the loaded container; and

transporting said at least one loaded container to the ultimate destination.

19. The method according to claim 18, wherein the step of transporting the at least two containers to the customer's premises includes transporting three containers, said containers being joined by a plurality of latching devices extending between adjacent corner fittings.

20. The method according to claim 19, wherein said land vehicle includes a cab, and wherein the step of loading freight in at least one of the empty containers includes loading the freight into the empty container closest the cab through all remaining empty containers.

21. The method according to claim 18, wherein the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a second vehicle heading towards the ultimate destination.

22. The method according to claim 21, wherein said consolidation site is an airport and the second vehicle is an aircraft, the step of transporting the at least one loaded freight container to the ultimate destination includes placing the loaded containers on the air craft, flying the aircraft to another airport, removing the loaded freight

container from the aircraft, and placing the loaded freight container on a third vehicle heading to the ultimate destination.

23. The method according to claim 21, wherein said consolidation site is an a rail yard and the second vehicle is a rail car, the step of transporting the at least one loaded freight container to the ultimate destination includes placing the loaded containers on the rail car, transporting the rail car to another rail yard, removing the loaded freight container from the rail car, and placing the loaded freight container on a third vehicle heading to the ultimate destination.

24. The method according to claim 18, wherein the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a vessel heading towards the ultimate destination.

25. The method according to claim 24, wherein said consolidation site is a seaport and the vessel is a ship, the step of transporting the at least one loaded freight container to the ultimate destination includes placing the loaded containers on the ship, sailing the ship to another seaport, removing the loaded freight container from the ship, and placing the loaded freight container on a vehicle heading to the ultimate destination.

26. A method of shipping freight from the customer's premises to the ultimate destination, the method comprising:

providing at least three empty freight containers, each of said containers comprising a base, a roof, a pair of opposed side walls, a pair of opposed end walls, wherein said side walls, end walls, and base define at their respective intersections four bottom corners, wherein said side walls, end walls, and roof define at their respective intersections four top corners, each of said top corners and said bottom corners having a corner fitting mounted thereto, each end wall having an opening for the loading and removal of freight, said openings being sufficiently large to permit the

loading and removal of freight to and from the container by a conventional forklift, said container having a length of approximately thirteen feet;

providing a plurality of latching devices;

connecting three of the at least three containers together by linking the top corner fitting of one container to the adjacent corner fitting of another container with one of the latching devices, thereby forming a single unit;

transporting the containers to the customer's premises on a land vehicle;

at the customer's premises loading freight in at least one of the empty containers to form a loaded container and securing the freight in the loaded container; and

transporting said at least one loaded freight container to the ultimate destination.

27. The method according to claim 26, wherein the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight container from the land vehicle, and placing the loaded container on a vehicle heading towards the ultimate destination.

28. The method according to claim 27, wherein all containers of the single unit are loaded, said steps of removing the loaded freight container and placing the loaded containers are done by connecting a conventional lift to top corner fittings on each end of the single unit of containers.

29. The method according to claim 26, wherein the step of transporting the at least one loaded freight container to the ultimate destination includes transporting the loaded freight container to a consolidation site, removing the loaded freight containers from the land vehicle, and placing the loaded containers on a vessel heading towards the ultimate destination.

30. The method according to claim 29, wherein all containers of the single unit are loaded, said steps of removing the loaded freight container and placing the loaded

containers are done by connecting a conventional lift to top corner fittings on each end of the single unit of containers.

31. The method according to claim 26, wherein the method includes providing a predetermined spacing between adjacent containers using the latching devices

32. The system according to claim 31, wherein each of said latching device has a first latching portion and a second latching portion, wherein the step of linking the top corner fitting of one container to the adjacent corner fitting of another container includes said first latching portion mechanically grasping one of said corner fittings associated with one of the containers, and said second latching portion mechanically grasping one of the corner fittings of the adjacent container.

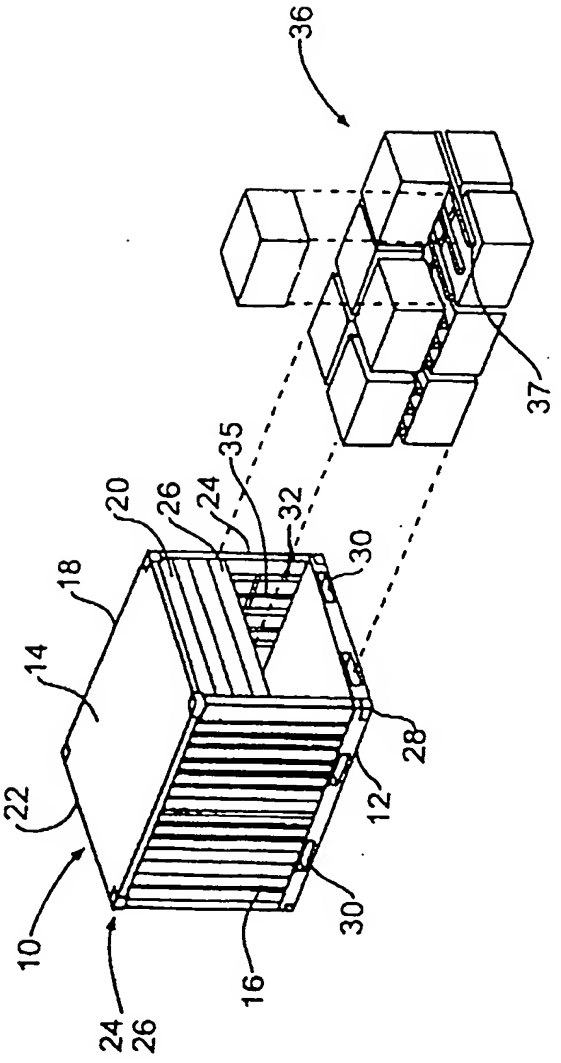

FIG. 1

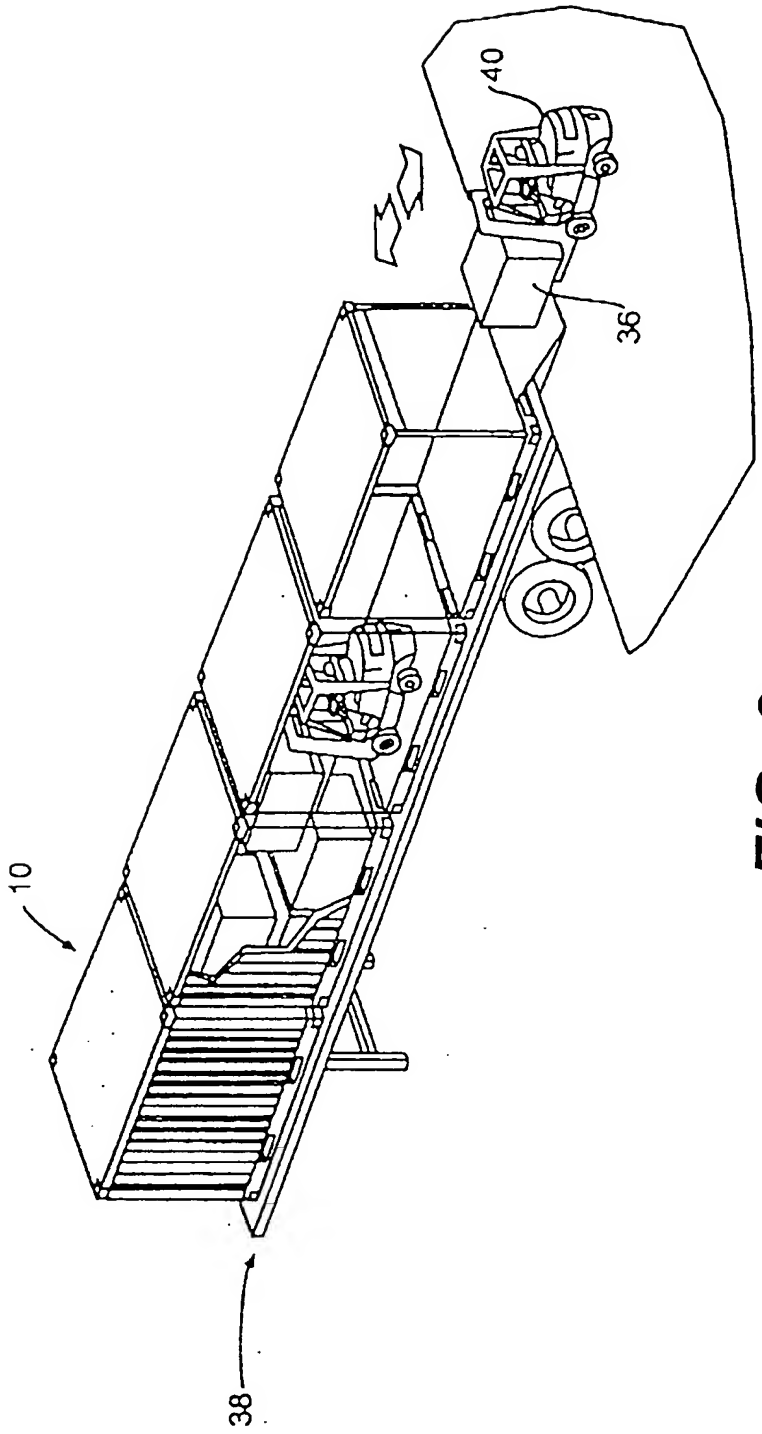

FIG. 2

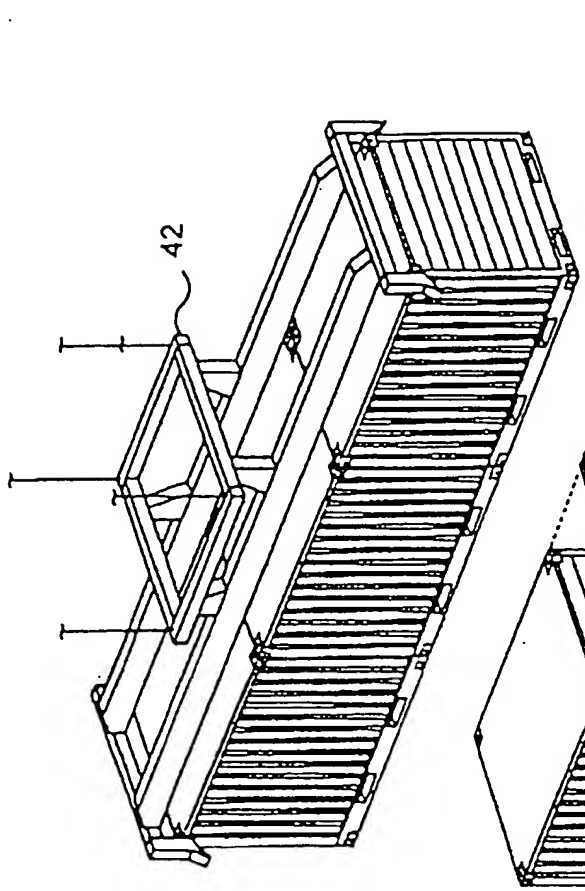

FIG. 3A

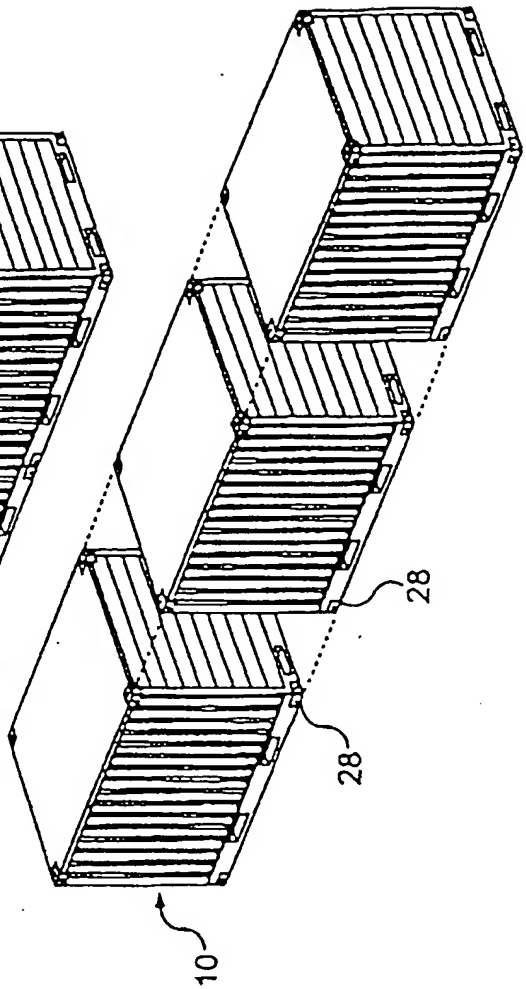

FIG. 3B

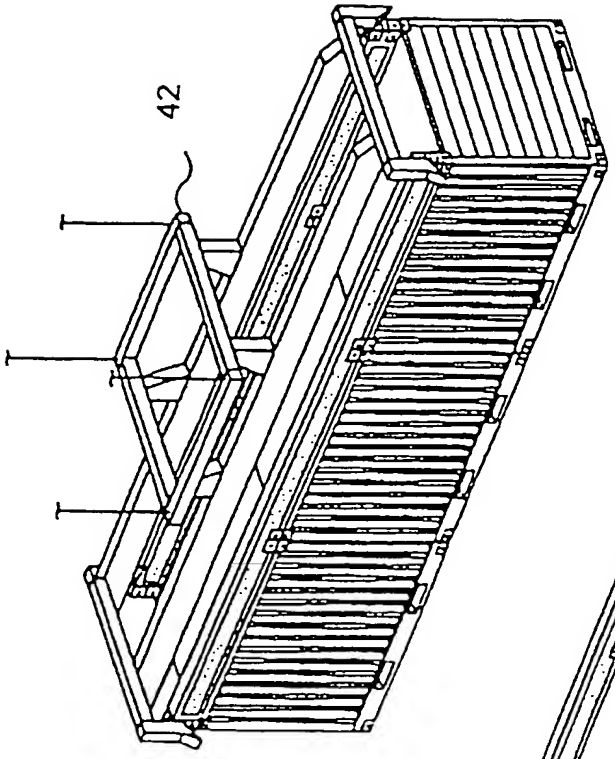

FIG. 4A

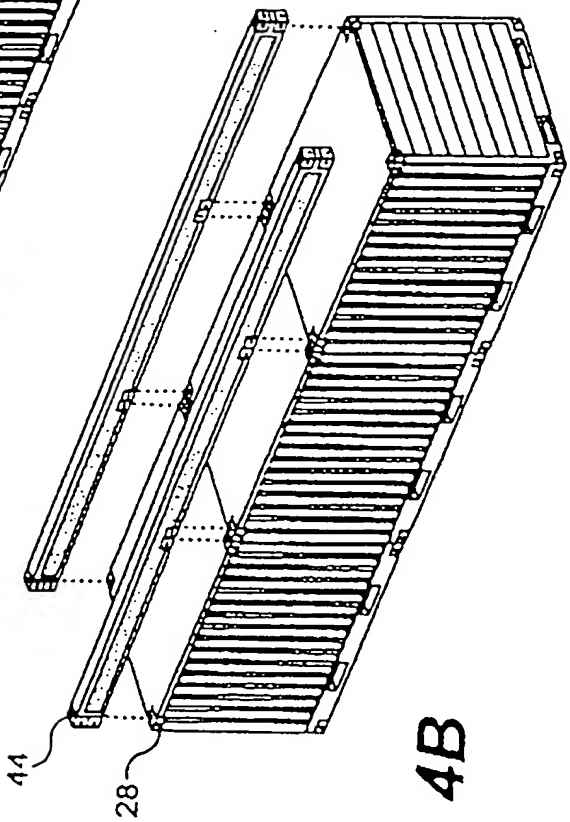

FIG. 4B

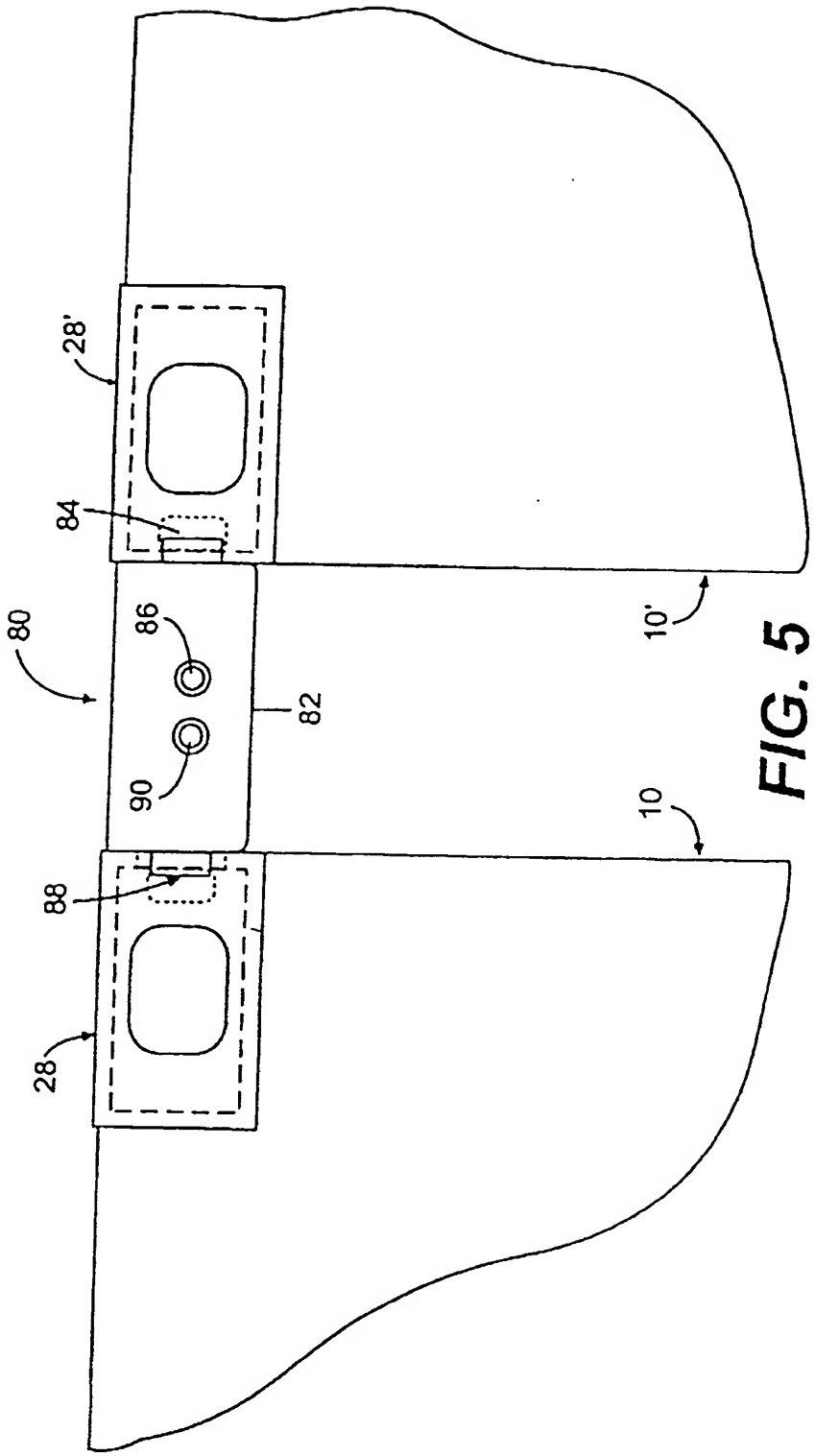

FIG. 5

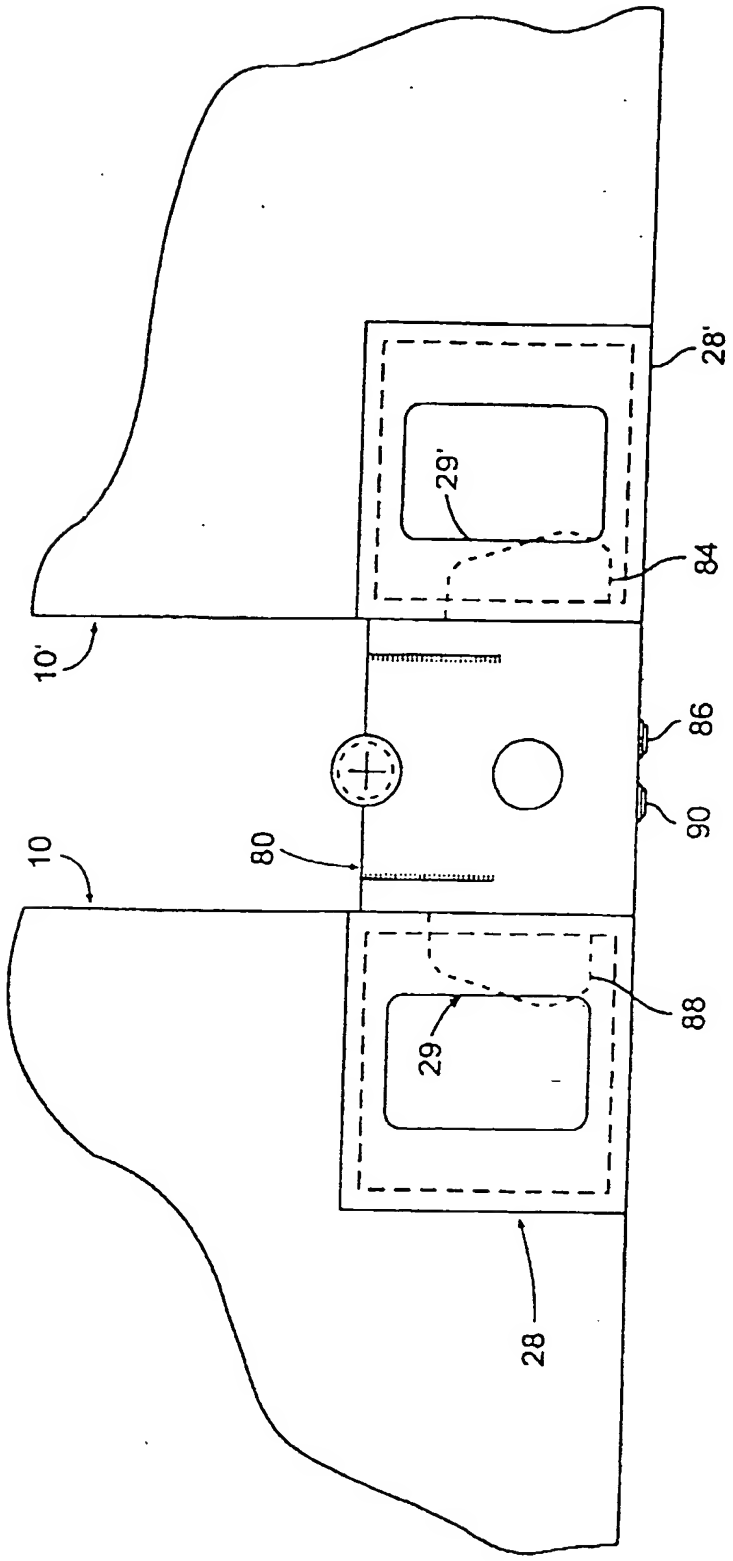

FIG.6

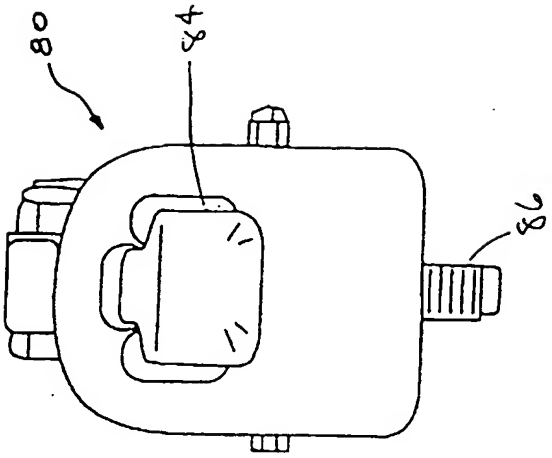

FIG. 7B

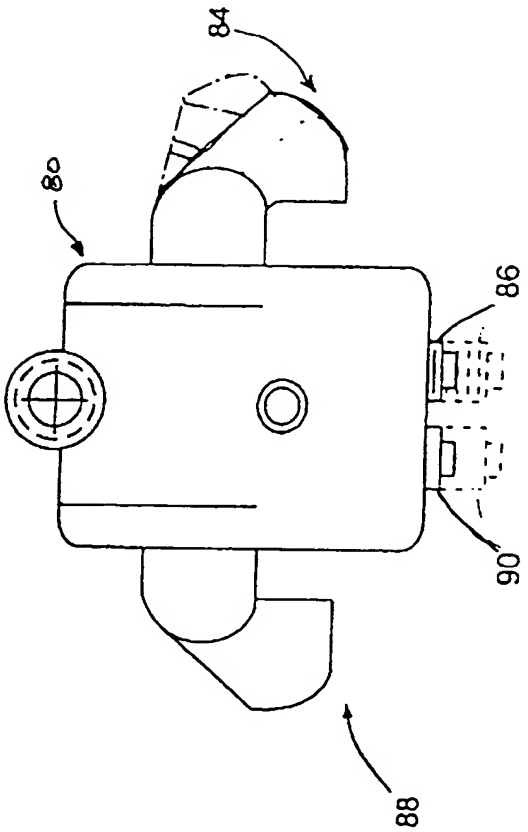

FIG. 7A

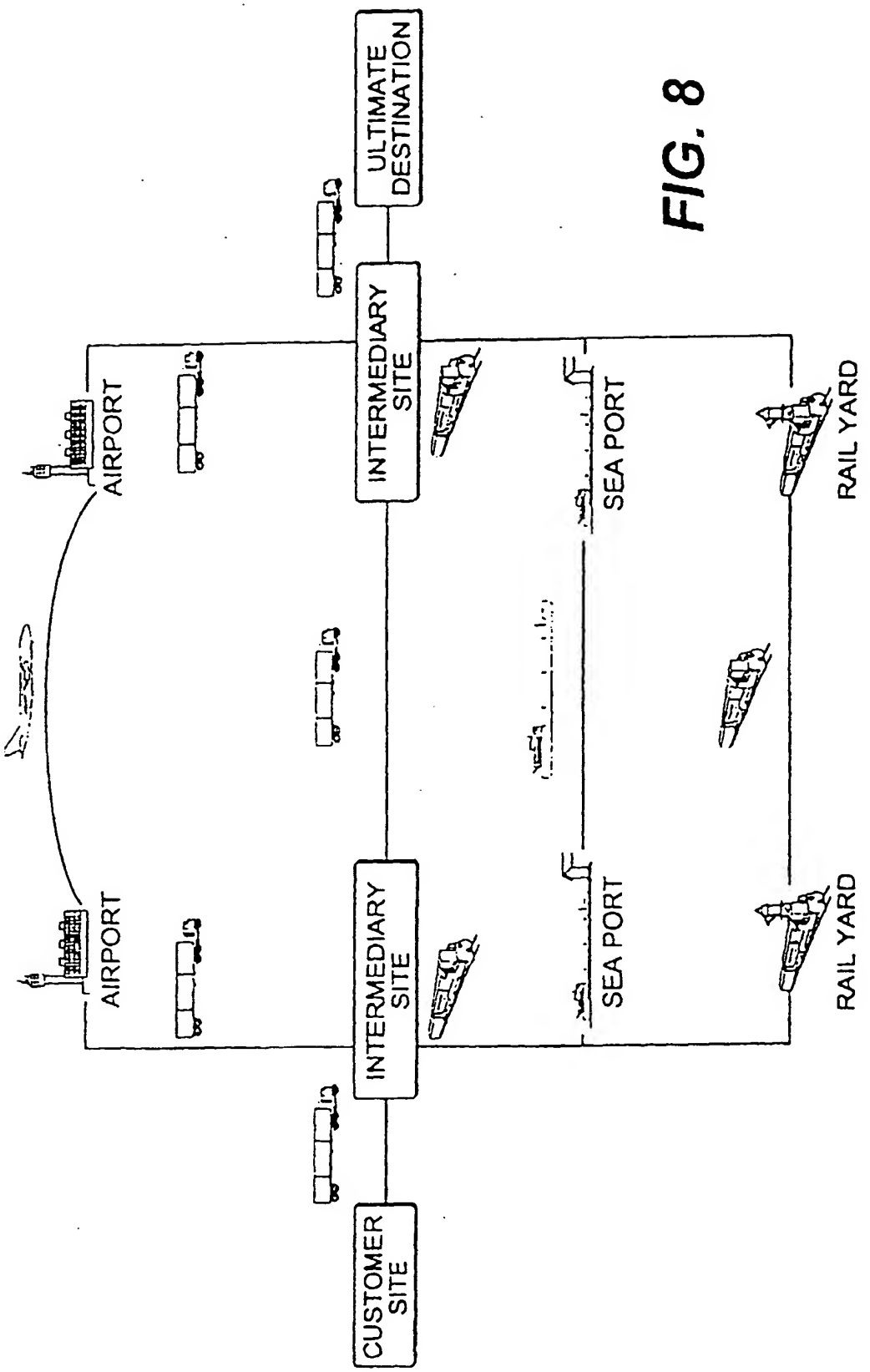
ULTIMATE DESTINATION
INTERMEDIARY SITE
AIRPORT
SEA PORT
RAIL YARD
INTERMEDIARY SITE
AIRPORT
SEA PORT
RAIL YARD
CUSTOMER SITE

FIG. 8

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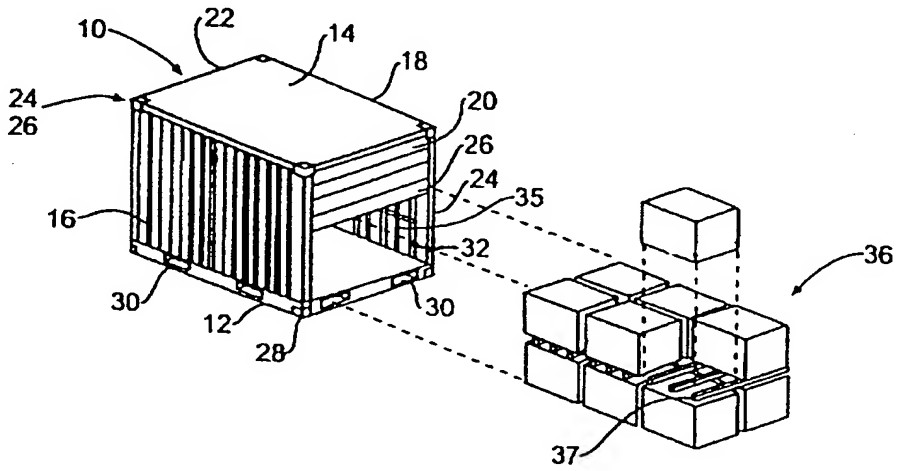
Published:
— *with international search report*

[Continued on next page]

(54) Title: FREIGHT CONTAINER, SYSTEM, AND METHOD FOR SHIPPING FREIGHT



(57) Abstract: A freight transportation container can accept standard-sized pallets and is suitable for transportation by land, sea, or air. The size and construction of the container permits the loading and removal of freight by a conventional fork lift truck through the container, and allows placement of the container in standard-sized trucks, rail cars, sea vessels, and aircraft. The freight container also is part of a system and method for transportation whereby the freight can be loaded, inventoried, locked, and sealed at a customer's premise, and remain under the custody of one entity throughout shipment of the freight to the consignee. The containers can be linked together to assist in placing several of the containers on the truck, trailer, or rail car, where they can remain linked for transportation. The containers can be brought to a customer's premise on the truck, trailer, or rail car. The containers are then loaded. Afterwards, the containers can be taken to holding areas, other trucks, ships, aircraft, or directly to the ultimate destination. Transactional information regarding the freight and destination is stored in a computer, allowing a central system to track the freight and generate appropriate business and customer documentation.

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(88) Date of publication of the international search report:
25 April 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Inter ·ional Application No
PCT/US 01/05602

A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D B60P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 679 589 A (SATCO INC) 2 November 1995 (1995-11-02) column 2, line 39 -column 4, line 56; claims; figures	1,2 7,8,12
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
12 October 2001	19/10/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Van Rolleghem, F

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INTERNATIONAL SEARCH REPORT

Inter ional Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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1

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FREIGHT CONTAINER, SYSTEM, AND METHOD FOR SHIPPING FREIGHT

DESCRIPTION OF THE INVENTION

This application claims the benefit of U.S. provisional application no. 60/184,322 filed February 23, 2000, the disclosure of which is hereby incorporated by reference.

Field of the Invention

In general, this invention relates to a freight container, method of shipping a freight container, and systems of shipping with the freight container. More particularly, the invention relates to a modular freight container; methods of shipping a plurality of modular containers by truck, rail, sea vessels, and aircraft; and systems for shipping modular containers from a customer's premises to the ultimate recipient's premises.

Background of the Invention

The efficient, safe, and secure shipment of freight, including but not limited to correspondence, materials, goods, components, and commercial products, is an important component in today's business, particularly in view of the international nature of most business enterprises. Freight often is shipped nationally and internationally by means of several different transportation devices, such as trucks, trains, ships, and airplanes. Before the freight reaches its destination, it is often handled by several different entities, such as truck companies, intermediate consolidators, railways, shipping companies, and airlines.

While a number of methods and systems for shipping freight are presently available, the shipment of large volumes of freight typically involves a complex and inefficient transfer and repackaging of freight before it ultimately is received by the